"The Specific Heats of Metals and the Relation of Specific Heat to Atomic Weight. Part II." By W. A. TILDEN, D.Sc., F.R.S., Professor of Chemistry in the Royal College of Science, London. Received December 8,—Read December 11, 1902.

(Abstract.)

The following values have been obtained for the mean specific heats of pure aluminium, nickel, cobalt, silver, and platinum, within the several limits of temperature indicated:—

Centigrade.	Aluminium.	Nickel.	Cobalt.	Silver.	Platinum.
−182° to +15°	0·1677	0·0838	0·0822	0·0519	0·0292
− 78 „ +15	0·1984	0·0975	0·0939	0·0550	—
+ 15 „ 100	—	0·1084	0·1030	0·0558	0·0315
15 „ 185	0·2189	0·1101	0·1047	0·0561	—
15 „ 335	0·2247	—	—	—	—
15 „ 350	—	0·1186	0·1087	0·0576	—
15 „ 415	—	0·1227	—	—	—
15 „ 435	0·2356	0·1240	0·1147	0·0581	0·0338
15 „ 550	—	0·1240	0·1209	—	—
15 „ 630	—	0·1246	0·1234	—	—
0 „ 1000	—	—	—	—	0·0377*
0 „ 1177	—	—	—	—	0·0388*

From these results the specific heats at successive temperatures on the absolute scale have been calculated, and it appears that the assumption of a constant atomic heat at absolute zero is untenable.

The mean specific heat of a sample of nickel steel, containing 36 per cent. of nickel and having remarkably small dilatation, was found to be as follows:—

Range of temperature.	Mean specific heat.
−182° to +15°	0·0947
15° „ 100°	0·1204
15° „ 360°	0·1245
15° „ 600°	0·1258

The mean specific heats of the sulphides of nickel and silver were also determined with the object of getting some evidence as to the cause of the difference observed between the two metals in regard to the influence of temperature on their respective specific heats. The following are the values obtained:—

* Violle, 'Comptes Rendus' (1877), vol. 85, p. 543; also 'Phil. Mag.,' [5], vol. 4, p. 318.

Range of temperature.	NiS.	Ag_2S.
$-182°$ to $+15°$	0·0972	0·0568
15° ,, 100°	0·1248	0·0737
15° ,, 324°	0·1333	0·0903

The mean value for the specific heat of silver sulphide is less than that for nickel sulphide throughout, but little can be deduced from the results till the influence of temperature on the specific heat of sulphur is known.

"Preliminary Note on the Relationships between Sun-spots and Terrestrial Magnetism." By C. CHREE, Sc.D., LL.D., F.R.S. Received December 18, 1902,—Read January 22, 1903.

(From the National Physical Laboratory.)

I have been engaged during the last two years on an analysis of the magnetic results obtained at Kew Observatory (now the National Physical Laboratory), during an 11-year period, 1890 to 1900. The work has been much interrupted, and is still incomplete. Amongst the points dealt with is the inter-relationship between sun-spot frequency and magnetic phenomena, and, as this has recently been engaging attention elsewhere, I have decided to put certain of my results on record at once. It has long been known from the researches of Balfour Stewart, Ellis, and others, that there is a close connection between the times of occurrence of greatest sun-spot frequency and largest amplitude of the diurnal inequality of magnetic declination and horizontal force. I have investigated whether the numerical relationship between the phenomena can be adequately represented mathematically in a simple way.

A convenient basis for the investigation was presented by the publication by Professor Cleveland Abbe in the 'U.S. Monthly Weather Review,' for November, 1901, of a table of sun-spot frequencies as calculated by Wolf and Wolfer for a very long series of years. After I had carried out all the calculations, Wolfer himself published a similar table* embodying his latest corrections. The differences from Abbe's table are trifling, and mainly confined to two years (1891 and 1892). I judged it best, however, to revise the whole of my arithmetic, so as to employ Wolfer's own most approved figures. In the following remarks S represents Wolfer's value for the sun-spot frequency. The above-mentioned table gives the mean S for each month and for each year.

The magnetic quantity selected for comparison is the mean monthly "range," meaning thereby the difference between the greatest and

* 'Met. Zeitschrift,' May, 1902 p. 195.